

H₂ – OD PROIZVODNJE DO POTROŠNJE VODIKA U INDUSTRIJI



Hrvatska udruga za razvoj i primjenu vodikovih gorivnih članaka
Predsjednik Ivica Jakić, Dipl.Ing.stroj.

HYDROGEN PRODUCTION METHODS – Colors of Hydrogen



Green

- In the electrolysis process water splits into hydrogen and oxygen; the electric energy in the process comes from green energy

Purple

- In the electrolysis process water splits into hydrogen and oxygen; the electric energy in the process comes from a nuclear reactor

Turquoise

- Hydrogen is produced in the process of gasification with usage of natural gas without CO₂ emission

Blue

- Produced as grey hydrogen but during the process CO₂ is captured for further usage

Grey

- Produced from fossil fuels; emission of greenhouse gases occurs

Black

- Extracted from a synthetic gas produced from coal

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EU TAKSONOMIJA: zeleni-čisti-obnovljivi vodik, proizvodnja za jednu 1ton/H₂ < 3ton/CO₂

METODE PROIZVODNJE (zelenog-čistog-obnovljivog) VODIKA

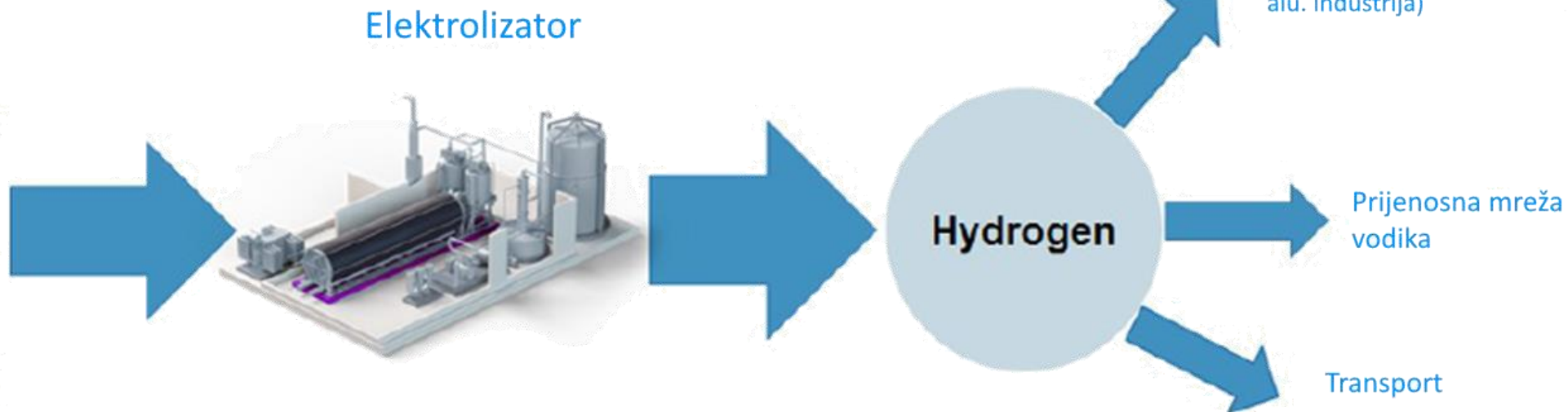


- OIE (sunčana el., vjetro el., hidro. el., geoterm. el., nuklearna el.) ---> Elektrolizer ---> $H_2 + O_2$
- UPLINJAVANJE ORGANSKOG OTPADA ($1150^{\circ}C$) ---> SINTETSKI PLIN ---> EL. ENERGIJA ---> H_2
- UPLINJAVANJE ORGANSKOG OTPADA ($1150^{\circ}C$) ---> SINTETSKI PLIN ---> H_2
- PLAZMA UPLINJAVANJE ORGANSKOG OTPADA ($3000^{\circ}C$) ---> H_2 + tekući CO_2
- HIIROC ---> PLAZMA UPLINJAVANJE METANA ---> H_2 + tekući CO_2

PROIZVODNJA VODIKA

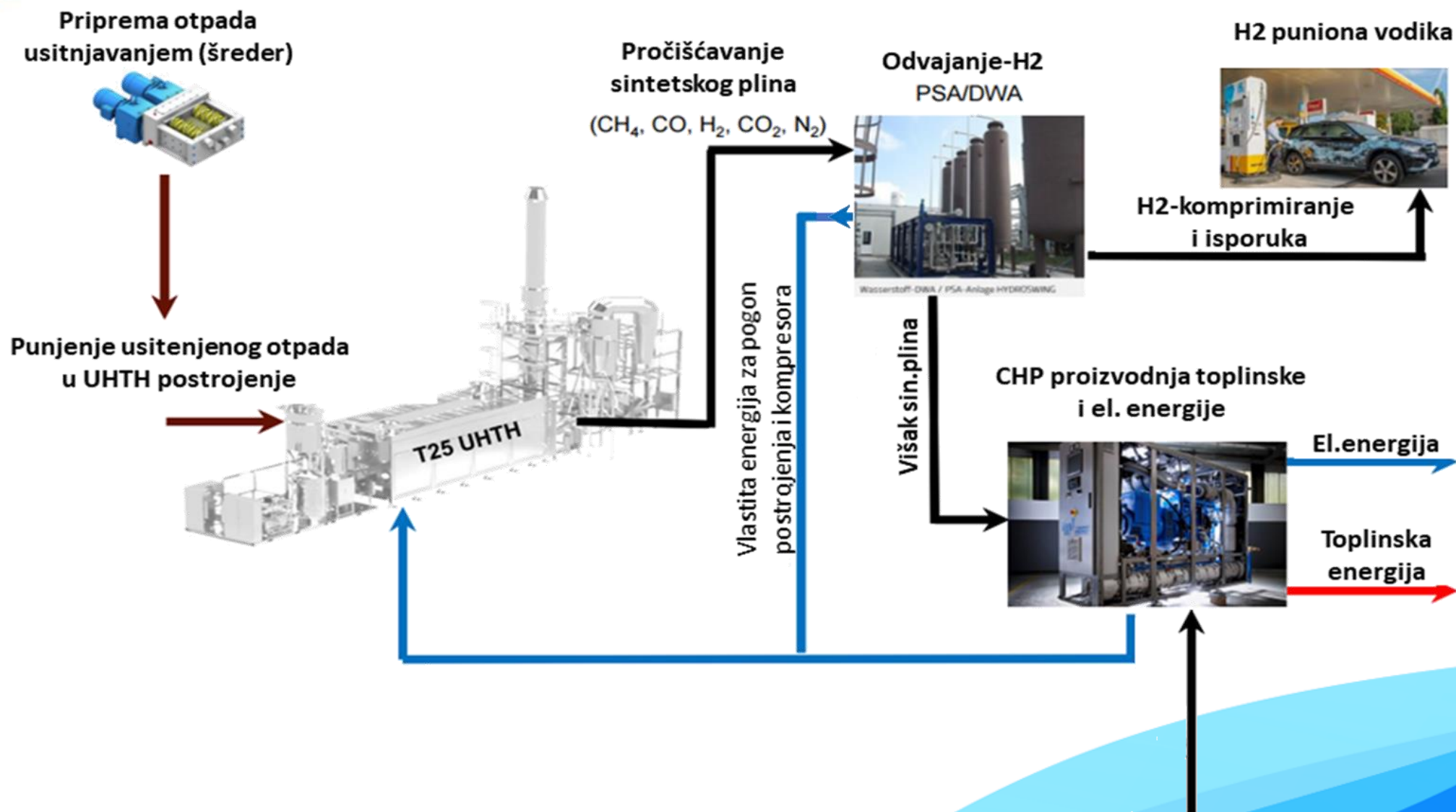


OIE + voda



Source:Engie, NEL any YPO (for illustration), Morgan Stanley Research

PROIZVODNJA VODIKA IZ ORGANSKOG OTPADA



DEKARBONIZACIJA INDUSTRIJE UPOTREBOM VODIKA



INDUSTRIJA ŽELJEZA I ČELIKA

- proizvodnja željeza umješavanje vodika sa koksom
- proizvodnja čelika u elektrolučnim pećima zelenom energijom i vodikom

INDUSTRIJA CEMENTA

- potpuna zamjena Petrol-koksa ili plina s vodikom
- umješavanje vodika s Petrol-koksom ili umješavanje vodika s prirodnim plinom s ciljem potpune zamjene ugljičnih energenata s vodikom

INDUSTRIJA ALUMINIJA

- upotreba zelene energije i vodika u procesu dobivanja čistog aluminija

INDUSTRIJA STAKLA

- zamjena plina s vodikom

INDUSTRIJA KAMENE I STAKLENE VUNE

- zamjena plina s vodikom

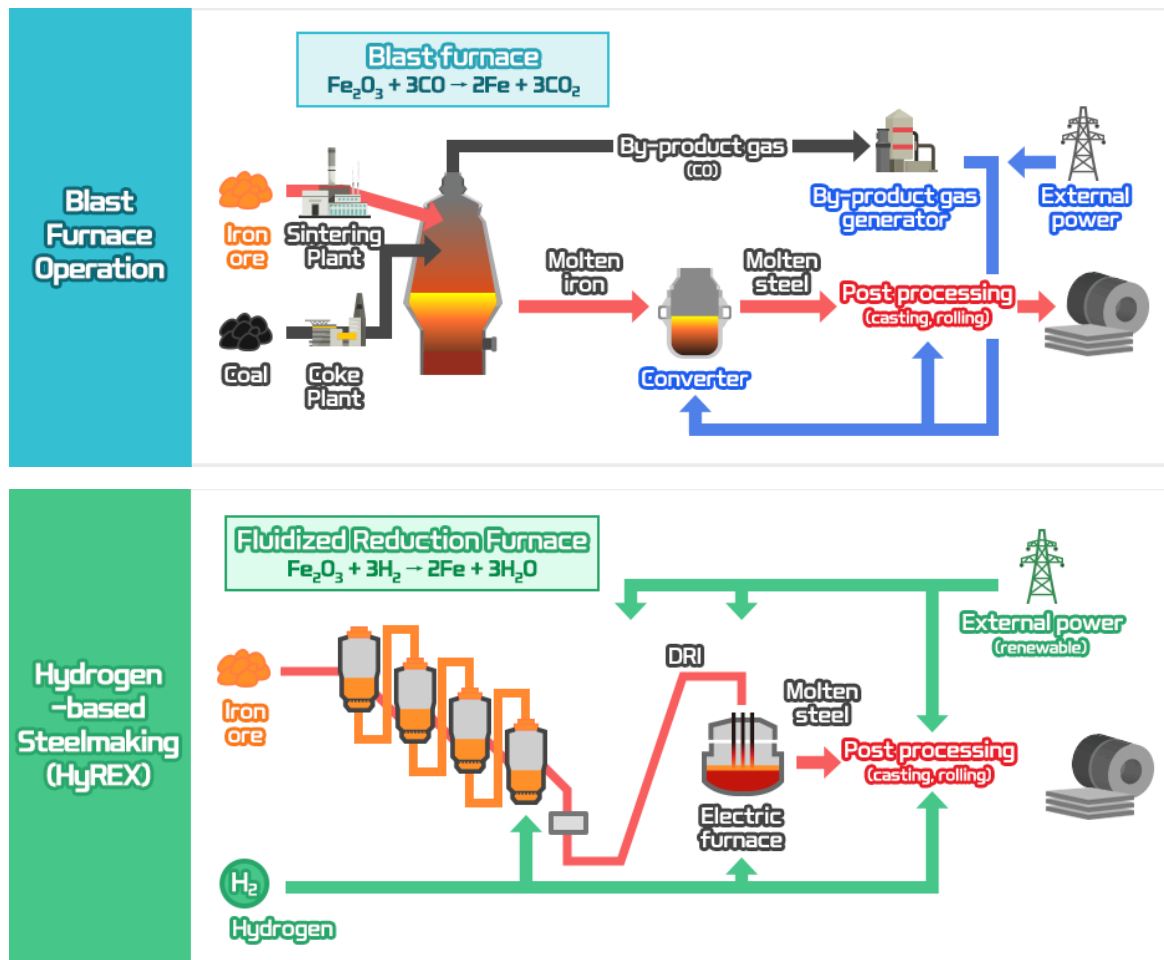
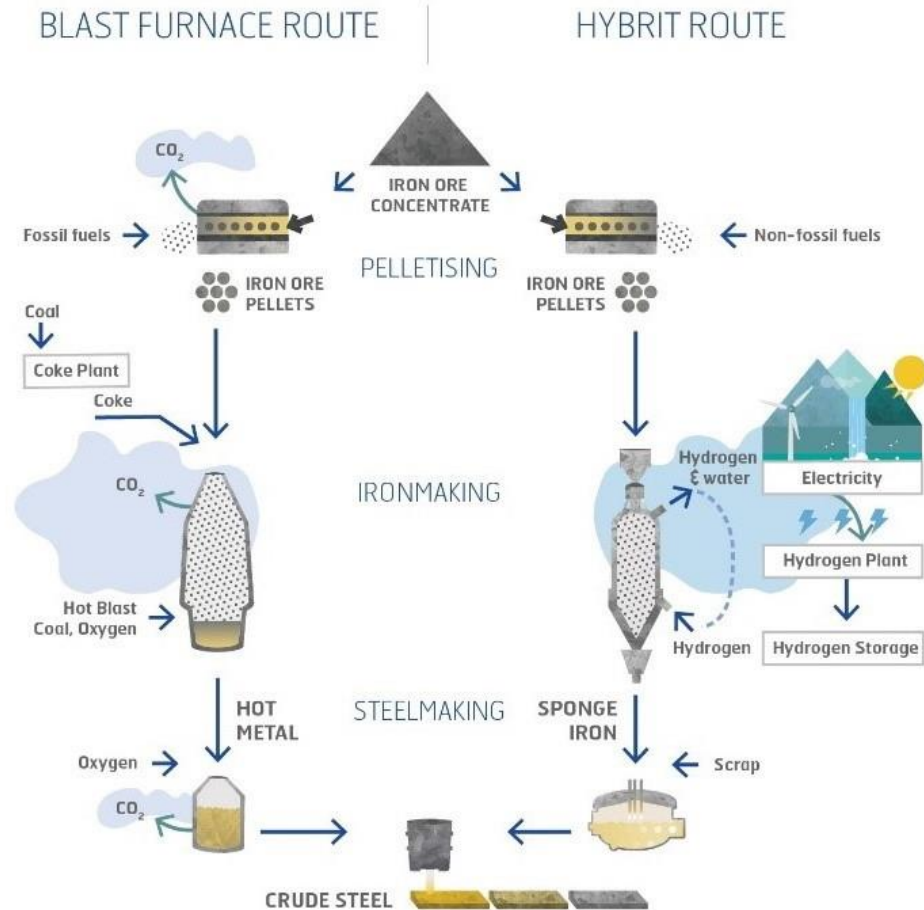
PETROKEMIJSKA INDUSTRIJA

- proizvodnja umjetnih gnojiva
- dobivanje zelenog vodika

INDUSTRIJA ŽELJEZA I ČELIKA

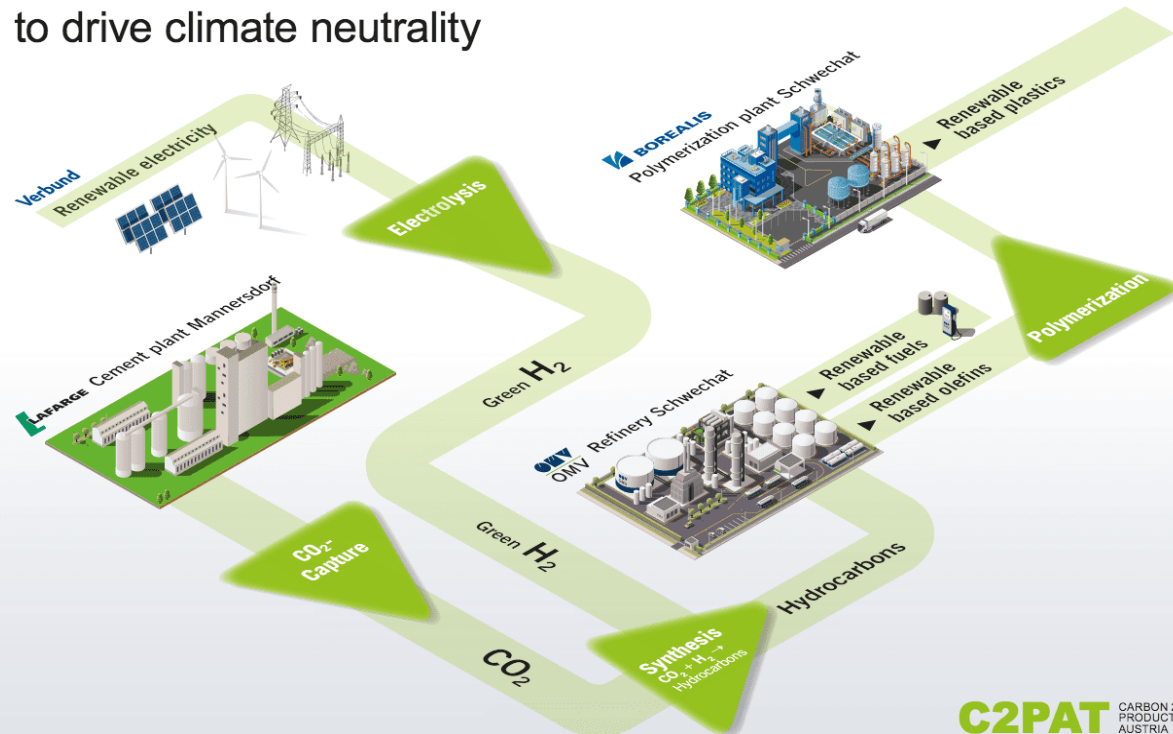
H₂

H₂ - Hydrogen Cell
Croatia



INDUSTRIJA CEMENTA

Cross sectoral value chain to drive climate neutrality



INDUSTRIJA ALUMINIJA





INDUSTRIJA KAMENE I STAKLENE VUNE



PETROKEMIJSKA INDUSTRIJA

H₂

H2 - Hydrogen Cell
Croatia

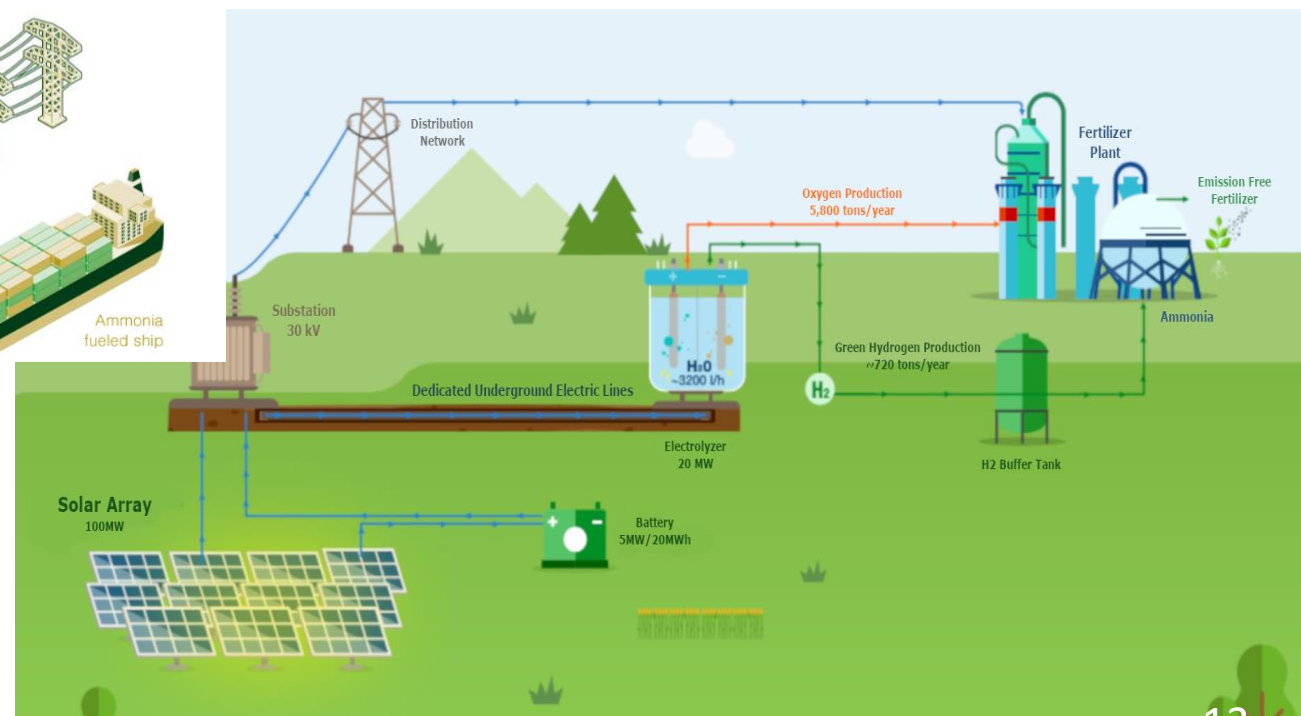
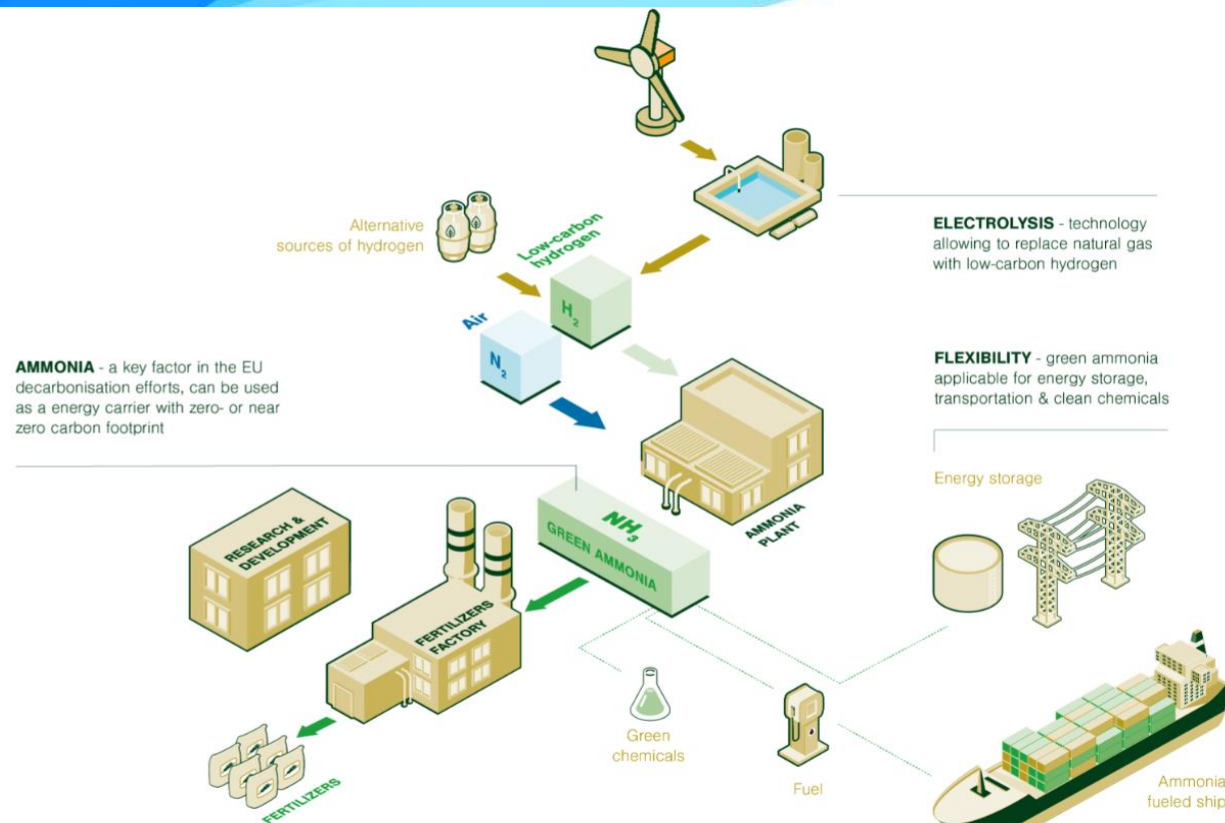
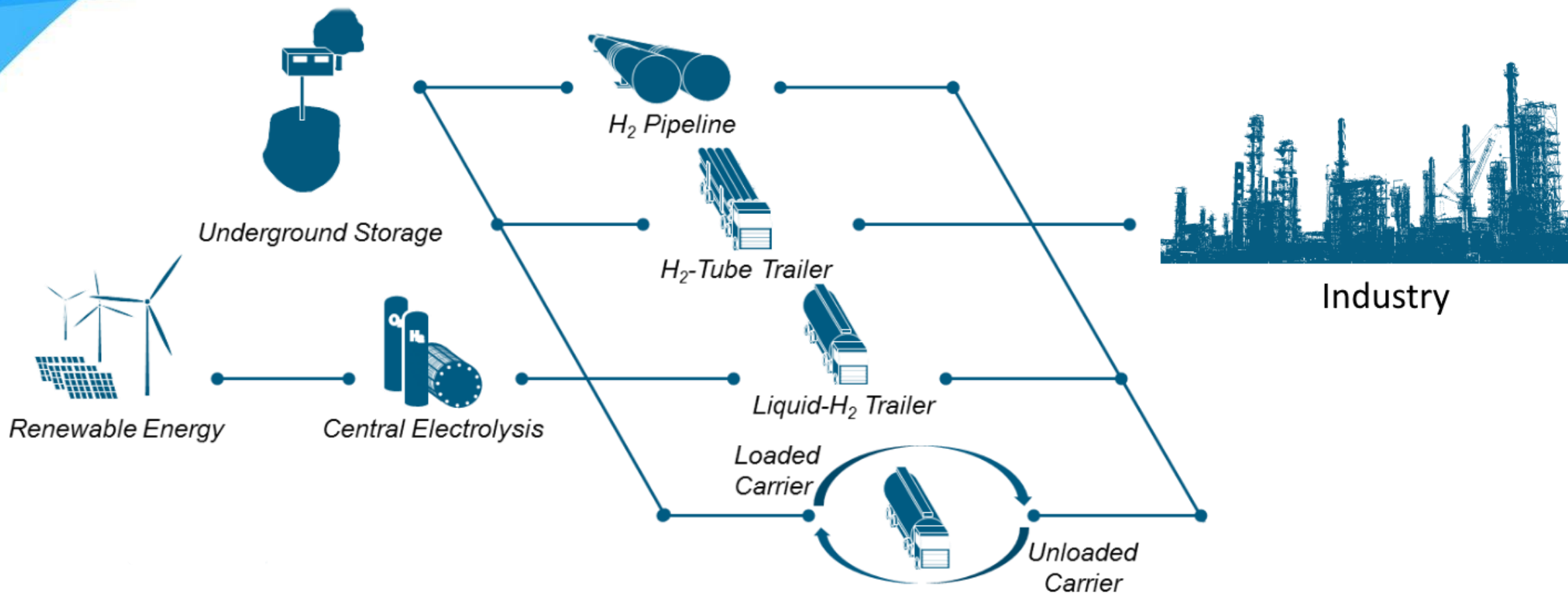
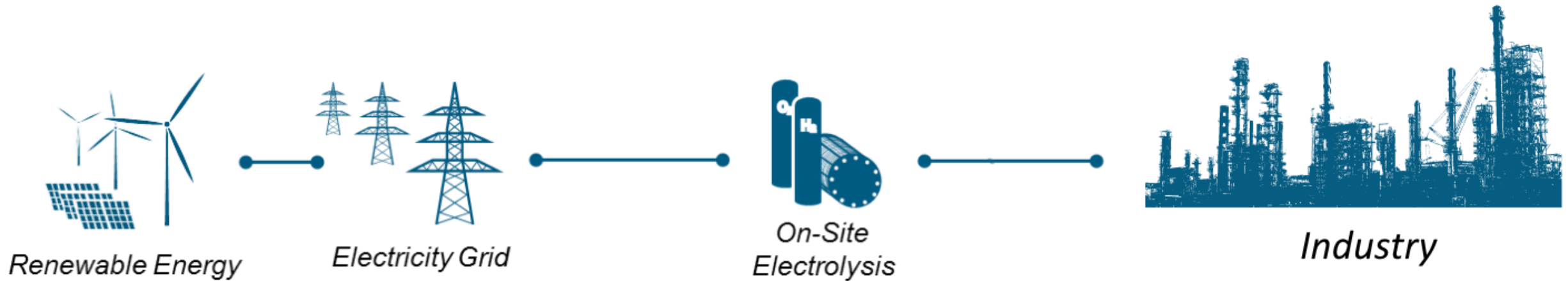


DIAGRAM PROIZVODNJE, TRANSPORTA, SKLADIŠTENJA I POTROŠNJE VODIKA



CENTRALIZIRANA PROIZVODNJA

DIAGRAM PROIZVODNJE, TRANSPORTA, SKLADIŠTENJA I POTROŠNJE VODIKA



DECENTRALIZIRANA PROIZVODNJA

EUROPSKA PRIJENOSNA MREŽA VODIKA DO 2040. GODINE

